

**ABSTRACT**

**[0042]** An improved thermal history sensor having multiple glass ceramic substrates with unique compositions is disclosed. By positioning the sensor adjacent to a component subject to thermal stressors, each of the glass ceramic substrates react with a different rate of nucleation and crystal growth and thus yield a specific measure of opacity. By comparing these values representing the opacity for each glass ceramic substrate, or thermal history fingerprint, to baseline data, information about the expected remaining useful lifetime of the component may be obtained.